WHAT IS CLAIMED IS:

1. A method of manufacturing a cutting element comprising:

selecting an ultra hard material which is not fully densified;

selecting a substrate at least a portion of which has a density that is less than 100% of full density of said at least a portion;

placing the ultra hard material over the substrate; and

processing the resulting assembly of substrate and ultra-hard material at a sufficient temperature and pressure for full densification and metallurgical joining of the substrate and ultra-hard material, wherein the density is selected for controlling the magnitude of the residual stresses generated on the ultra hard material layer during sintering.

2. A method as recited in claim 1 wherein a first portion of the substrate has said density and a second portion of the substrate is fully densified prior to processing.

3. A method as recited in claim 2 wherein said substrate first portion extends over the first portion and wherein the ultra hard material layer is placed over the second portion.

4. A method as recited in claim 3 wherein the ultra hard material layer is placed over at least part of the second portion.

5. A method as recited in claim 2 wherein an outer portion of the substrate has a density less than 100% of full density of said outer portion and an inner portion of the substrate is fully densified.

6. A method as recited in claim 1 wherein a first portion of the substrate has a first density and wherein a second portion of the substrate has a second density, wherein the first density is different from the second density.

7. A method as recited in claim 1 wherein the entire substrate has a density less than 100% of full density of the substrate.

8. A method as recited in claim 1 wherein said at least a portion has a density in the range of about 70% to about 90% of full density of said portion.

9. A method as recited in claim 1 wherein said at least a portion has a density in the range of about 40% to about 99% of full density of said portion.

10. A method as recited in claim 9 wherein said at least a portion has a density in the range of about 75% to about 99% of full density of said portion.

11. A method as recited in claim 1 wherein the substrate prior to sintering has a porosity of in the range of about 1% to about 30%.

12. A method as recited in claim 1 further comprising forming a non-uniform face on the substrate material, wherein the ultra hard material is placed over the non-uniform face.

13. A method for controlling sintering induced stresses generated on an ultra hard material layer of a cutting element, the method comprising:

selecting an ultra hard material which is not fully densified;

selecting a substrate at least a portion of which has a density less than 100% of full density of said portion for controlling the magnitude of the sintering-induced stresses generated; and

sintering the ultra hard material and the substrate to form the cutting element.

14. A method as recited in claim 13 wherein the substrate constraints shrinkage of the ultra hard material layer during sintering, and wherein the amount of constraint provided by the substrate is a function of the density of the substrate prior to sintering.

15. A method as recited in claim 13 wherein a first portion of the substrate has a first density less than 100% of full density and a second portion of the substrate is fully densified prior to processing.

16. A method as recited in claim 13 wherein a first portion of the substrate has a first density and a second portion of the substrate has a second density different from the first density.

17. A method as recited in claim 13 wherein the entire substrate has a density less than 100% of full density.

18. A method as recited in claim 13 wherein said at least a portion has a density in the range of about 70% to about 90% of full density of said portion.

19. A method as recited in claim 13 wherein said at least a portion has a density in the range of about 40% to about 99% of full density of said portion.

20. A method as recited in claim 19 wherein said at least a portion has a density in the range of about 75% to about 99% of full density of said portion.

21. A method as recited in claim 13 wherein said at least a portion has a density in the range of about 40% to about 70% of full density of said portion.

22. A method as recited in claim 13 wherein the substrate prior to sintering has a porosity of in the range of about 1% to about 30%.

23. A method for controlling sintering induced stresses generated on the an ultra hard material layer of a cutting element, the method comprising:

selecting an ultra hard material which is not fully densified;

controlling the constraint by selecting a substrate at least a portion of which has a density less than 100% of full density; and

sintering the ultra hard material and the substrate to form the cutting element.

24. A method as recited in claim 23 wherein controlling the constraint comprises reducing the constraint by reducing the density.

25. A method of manufacturing a cutting element comprising:

selecting an ultra hard material which is not fully densified;

selecting a substrate having a first portion that has a first density less than 100% of full density, and a second portion that has a second density that is different from the first density;

placing the ultra hard material over the substrate material; and

processing the resulting assembly of substrate and ultra-hard materials at a sufficient temperature and pressure for full densification and metallurgical joining of the substrate and ultra-hard material.

26. A method as recited in claim 25 wherein the first density is in the range of about 70% to about 90% of full density.

27. A method as recited in claim 25 wherein the first density is in the range of about 40% to about 99% of full density.

28. A method as recited in claim 27. wherein the first density is in the range of about 75% to about 99% of full density.

29. A method as recited in claim 25 wherein the first density is in the range of about 40% to about 70% of full density.

30. A method as recited in claim 25 wherein the substrate prior to sintering has a porosity of in the range of about 1% to about 30%.

31. A method as recited in claim 25 further comprising forming a non-uniform face on the substrate material, wherein the ultra hard material is placed over the non-uniform face.

32. A method as recited in claim 25 wherein the second degree of density is 100% of full density.

33. A method as recited in claim 25 wherein first and second densities are selected for controlling the magnitude of the residual stresses generated on the ultra hard material layer during sintering.